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CONTROLLING THE GARDEN WEBWORM IN ALFALFA FIELDS

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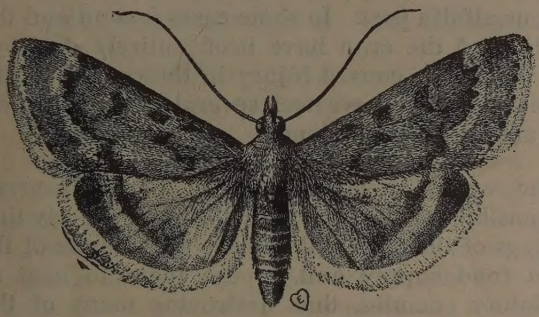

Parent of the Garden Webworm, Much Enlarged

FARMERS' BULLETIN 944
UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Entomology
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Washington, D. C. Issued August, 1918

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64453°—18—Bull. 944 WASHINGTON : GOVERNMENT PRINTING OFFICE : 1918

THE GARDEN WEBWORM, known as an enemy of truck crops, has become in recent years a serious alfalfa pest. In some cases second and third cuttings of the crop have been entirely destroyed. The insect has caused injury in the central western States, and there have been several serious outbreaks in Kansas and Oklahoma.

The worm or larva stage of the webworm is responsible for the injury to alfalfa. Properly timed cuttings of the crop will deprive these larvæ of their main food supply and expose them to heat and predatory enemies, thus destroying many of them and helping to decrease future damage.

Since the larvæ feed on several kinds of weeds, clean cultural methods and weed destruction are necessary in ridding alfalfa fields of the pest.

CONTROLLING THE GARDEN WEBWORM[1] IN ALFALFA FIELDS.

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HOW THE WEBWORM INJURES ALFALFA.

THE ALFALFA GROWER is not likely to observe the work of the garden webworm until his fields have been considerably damaged, as the first injury is done in the foliage nearly out of sight. The work is characteristic. The leaves are stripped from the stems and the plants are webbed together by dozens of small, black-spotted green and greenish-yellow worms or caterpillars which hide within the webs. These are the caterpillars or young of small, yellowish-brown moths which also are abundant in such fields. The presence of the web masses and moths and the greatly wilted appearance of the infested fields are sufficient to enable one, upon examination, to identify the cause of the injury readily.

WHERE DAMAGE HAS OCCURRED.

The garden webworm has been observed in most of the Central, Western, and Southern States. It also occurs in South America and Mexico. It has caused extensive damage to alfalfa in California, Nebraska, Iowa, Missouri, New Mexico, Kansas, Oklahoma, and Texas. In infested localities of the last three States it is not uncommon for second and third annual cuttings of alfalfa to be entirely destroyed by the pest.

Garden webworms were first noticed in injurious numbers in the central western United States in 1861 and 1864, when a considerable acreage of corn and garden crops was destroyed. In 1873 webworms caused much damage to beets, potatoes, garden crops, and other plants

[1] *Loxostege similalis* Guenée; order Lepidoptera, family Pyralidae.

in the Neosha Valley, in eastern Kansas. In 1880 they appeared in large numbers in various crops over large areas in the Central West. In 1900 the first extensive injury to alfalfa was wrought by them in States west of and adjacent to the Mississippi River and in Texas. Again, in 1903 and 1904 serious damage occurred in Texas and Oklahoma to corn and cotton and to other farm crops in various localities in Ohio, Indiana, Nebraska, Kansas, and Oklahoma. In 1909 great damage was done to alfalfa in Kansas and Oklahoma. In 1911 and 1914, especially, severe outbreaks occurred during July and August in several localities in Kansas and Oklahoma. Since 1909 injury to alfalfa has become steadily more serious and widespread in the Central Western States.

FIG. 1.—The garden webworm: Eggs. Much enlarged.

WHAT THE WEBWORM LOOKS LIKE.

The egg (fig. 1) is very small, oblong oval, and about one-fortieth of an inch in diameter. The eggs are deposited in a mass on the foliage of the plant, and are covered and held together by a thin, gelatinous fluid. They are so placed as partly to overlap one another, and the masses are almost transparent against the green background of the leaves, making them difficult of detection. When first laid the egg is of a delicate cream color, and remains so until about one day before hatching, when the coiled body and dark-colored head of the tiny larva within cause the egg to become slightly darker.

FIG. 2.—The garden webworm: Caterpillar or "worm." Much enlarged.

The larva, caterpillar, or webworm stage (fig. 2) is the one that causes the injury to the plant. When fully grown this larva is of a greenish-brown color and is about three-fourths to seven-eighths of an inch in length. Upon each body segment on each side of the back, arranged in triangles, are three tiny black spots, in each of which is inserted a short, stiff hair.

FIG. 3.—The garden webworm: Pupa or resting stage. Much enlarged.

The pupa or resting stage (fig. 3) is that into which the fully matured larva changes after descending from the plants to the ground and inclosing itself in a tiny silken cell in the trash and leaves on the ground or just beneath the surface. In this cell it transforms into a tiny light-brown chrysalis about

three-eighths of an inch in length, cylindrical in the middle and tapering to a point at each end.

The adult is a small moth with a wing spread of about three-fourths of an inch. The color ranges from reddish brown to dark gray with varying darker and lighter markings on the wings.

SEASONAL HABITS.

In the course of its development this insect passes successively through the egg, larva, pupa, and adult stages. In the latitude of Kansas and Oklahoma the moths appear in the alfalfa fields about May 1. After mating they deposit their eggs, usually in clusters of 40 or 50, upon the lower surfaces of the leaves, usually those near the top of the alfalfa plants. These eggs hatch in about 4 or 5 days into tiny larvæ.

Soon after hatching these larvæ begin feeding upon the surface of the alfalfa leaves, and as they grow larger they web together the tops of the plants and feed upon the portions within the web masses until nothing is left of the plants except the skeletons of leaves and stems. After the more succulent parts of infested plants have been devoured the larvæ move to other near-by plants. If larvæ are present in a field in sufficient numbers an entire cutting of the crop may be ruined. An alfalfa field which has been badly damaged by this pest presents a scorched, withered appearance as if killed by frost. Many fields are injured only in irregular spots, these spots occurring usually on sandy upland. The larvæ also feed freely upon corn, wheat, careless weed or pigweed,[1] lamb's-quarters,[2] and a number of other plants. If disturbed they swing quickly from the infested plant on silken threads and endeavor to hide in the rubbish on the surface of the ground. They are very active, wriggling about rapidly if disturbed.

After about 20 days, when fully grown, the larvæ descend to the ground and form about themselves the tiny silken cocoons in which they change to the pupa or resting stage. During the pupa stage they remain inactive and take no food, although most remarkable internal changes in structure are taking place. The length of the silken cocoons, or pupal cells, depends upon the moisture and texture of the soil and the amount of trash about the plants. In loose sandy soil they are often slightly more than 1½ inches long, but in heavy, dry soil they usually are not more than one-half to three-fourths of an inch long. The cocoons are about three-sixteenths of an inch in length. They extend downward in a nearly vertical position, the top end even with the surface of the soil. After about 10 days the pupal case splits open and the tiny adult or moth issues from the top end of the silken cocoon.

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[1] *Amaranthus* spp. [2] *Chenopodium album* L.

For several hours after emerging the moths do not fly but remain quietly waiting for the wings to become entirely expanded. They make only short flights, from 10 to 25 yards in length, when disturbed, and usually alight on the opposite side of the foliage from the pursuer. The distance the moths may fly is not known, although doubtless they may migrate several miles. They are most active at night, and are strongly attracted to lights. Individual females may deposit as many as 300 or 400 eggs. These eggs are placed on the alfalfa plants and on adjacent weeds. From 3 to 10 days elapse from the time the moths emerge until they begin to lay eggs. The moths live only a short time—sometimes only a few days. They feed upon the nectar in the alfalfa blossoms.

In the latitudes of Kansas and Oklahoma there are, apparently, four generations annually. The moths of the first generation appear about May 1, those of the second appear about July 10, those of the third about August 10, and those of the fourth about September 10. Individuals of the fourth, or of a possible fifth, generation may be present in the alfalfa fields for several weeks thereafter. The form or stage in which the insect overwinters in that latitude has not been definitely determined.

In the latitude of southern Texas the insects are present in the fields during the entire year. During the warmer months they complete all stages of their development in from 30 to 35 days, while during the cooler months the period of their development is somewhat longer.

NATURAL ENEMIES OF THE WEBWORM.

Enemies of several kinds prey upon and devour the larvæ of the garden webworm and assist to some degree in its control. The more efficient of these are common toads, horned toads, birds, and barnyard poultry, and certain species of ants and beetles. The common toad is probably the most useful of these, as stomachs of individual toads upon examination have been known to contain 70 or more webworms. Several parasitic enemies are also known to attack the larvæ of the webworm and may possibly assist in some degree in preventing its increase, as seven species of wasplike parasites and two species of flies have been reared from larvæ and pupæ.

Notwithstanding the helpful work of these natural enemies of the webworm, it would be unwise for the alfalfa grower to defer carrying out any active control measures in the expectation that some of these enemies eventually would subdue the pest, since this seldom occurs in time to save the crops.

HOW TO CONTROL THE WEBWORM IN ALFALFA FIELDS.

TIMELY CUTTINGS.

An excellent means of controlling the webworm in alfalfa fields is by properly timed cuttings of the several crops. When the alfalfa crop in an infested field has begun to get well into bloom, or when the young shoots have begun to appear near the bases of the plants, the cutting should be made as quickly as possible. Removal of the hay at this time will cause large numbers of larvæ to perish through lack of food and exposure to heat and predacious enemies.

It is a common practice of the farmers to cut any infested young alfalfa less than 6 inches in height as soon the pest is detected upon it. The hay from such cuttings has no commercial value, but its removal from the field deprives the larvæ of food and hastens their death. But the brush drag, described below, has been used successfully to kill webworms in alfalfa only a few inches high, thus saving the crop. Besides webworms, many other alfalfa pests are killed by the brush drag.

The alfalfa crop reserved for seed should be kept under careful observation, and in case webworms become numerous therein the crop should be cut immediately for hay. Unless such fields are carefully watched, the damage may increase rapidly and quickly render the crop practically worthless either for hay or for seed.

BRUSH DRAGS.

Brush drags have been found valuable after the cutting of infested fields to insure the destruction of a greater number of larvæ. An easily constructed drag may be made by attaching several short, tough branches of trees to one side of a strong timber 10 or 12 feet in length, propelling the drag by means of a team attached to the timber on the side opposite the brush. A piece of timber or other heavy weight placed on the brush is of value. With such a drag a large field may be covered in a short time. If necessary, heavily infested fields may be dragged twice without injury to the alfalfa plants.

CLEAN CULTIVATION.

Clean cultural methods are also of much value in controlling this pest. Since pigweed and lamb's-quarters are its favorite natural food plants, it is important that fields, fence rows, and near-by waste ground be cleared of these and other weeds. The pest often breeds upon such weeds and migrates later to near-by alfalfa which would escape injury if these weeds were not present.

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